

To Evaluate the Pattern of Asthma Control Using Asthma Control Test among Asthmatic Patients Presenting at a Tertiary Care Hospital

ANEEDA MANSOOR, CH. ADNAN AHMED ATHER, HAFIZ MUHAMMAD SAJID JEHANGIR, MAHRUKH KHOSA

ABSTRACT

Aim: To evaluate patterns of asthma control among asthmatic pts presenting at a tertiary care hospital.

Study design: It was a descriptive cross sectional study.

Setting: Medical Outdoor and Indoor departments of Mayo Hospital Lahore along with Emergency department of Mayo Hospital Lahore.

Duration of study: The duration of study was six months from the date of approval of synopsis, from 19-03-2015 to 18-09-2015.

Results: We studied 129 patients, 60(46.5%) were male and 69(53.5%) were female patients. Out of them 72(55.81%) belong to 20 to 30 year age group and 57(44.19%) belong to 31 to 40 year age group. Regarding BMI, 14 (10.9%) were underweight, 83 (64.3%) had normal BMI, 29(22.5%) were overweight and 3(2.3%) were obese. With respect to educational status, 29(22.5%) were illiterate, 27(20%) were primary educated, 22(17.1%) were secondary educated, 30 (23.3%) were matric, 15(11.6%) were college and 6(4.7%) were university graduates.

Conclusion: Asthma is very common in our population and most of the time uncontrolled in our population. Factors leading to uncontrolled asthma is ignorance, non-adherence to medication, low literacy rate, repeated exposure to allergens and poor resources. There is need to stratify different patterns of asthma control in different modes of presentation. For this we need a simple tool like Asthma Control Test (ACT), which is easy for the patients and as well as physicians in a periphery, to classify our patients, prescribe necessary medicines and timely referral to higher health care facility.

Keywords: Bronchial Asthma, airflow limitation, allergens, uncontrolled asthma, non-adherence.

INTRODUCTION

Asthma is a heterogeneous disease usually characterized by chronic airway inflammation. It is defined by history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and chronic cough that vary over time and in intensity together with variable expiratory airflow limitation¹. Asthma has affected large population of world². About 300 million people are affected worldwide^{3,4}. The number of disability adjusted life years lost is estimated 15 million per year that is similar to diabetes³. Asthma prevalence is 10% in Eastern Africa and Australia, 7.5 to 10% in Europe, up to 5% in South East Asia, including Pakistan and 2.5% in Eastern and Central Asia⁵. The five countries with highest asthma prevalence are Australia (21.5%), Sweden (20.2%), U.K (18.2%), Netherlands (15.3%) and Brazil (13%). Asthma is more common in females than males⁴. In one local study, asthma prevalence was found to be 10% in our population,

with males (8%) and females (12%) and only 4% among them were known asthmatics⁶. In international and local studies also clearly showed that females are more frequently affected than males^{2,8}. But the objective findings are better in females than males⁹. According to a local study, 18.2% of population also had nasal allergies⁶. Blemish and fears of life long treatment are barriers to seek medical attention⁶. The diagnosis of asthma depends on clinical suspicion, history, physical examination and diagnostic tests, particularly spirometry and PEF¹. The same tests are required to monitor disease, progression, severity and variation in time and intensity¹. Adequate skills and quality spirometry are essential for good and accurate results¹⁰. Developed world is introducing online techniques (electronic monitoring) to help patients monitor their disease and to consult their primary care physician accordingly^{3,11,12,13}. There are simple tools to help our rural patients like, Asthma Control Test (ACT), Asthma Control Questionnaire (ACQ, five symptoms based questionnaire), ACQ-6 (including reliever medicine use, in addition to five

*Department of Medicine, K EMU/Mayo Hospital, Lahore
Correspondence to Dr. Ch. Adnan Ahmed Ather Email:
adnanahmedather@gmail.com Cell: 0333-4275911*

symptom based questionnaire), ACQ-7 (including reliever medicine use and bronchodilator reversibility testing in addition to five symptoms based questionnaire, annexure III), ATAQ (Asthma Therapy Assessment Questionnaire, annexure IV), ACSS (Asthma Control Scoring System, annexure V), AQLQ (asthma quality of life questionnaire, annexure VI). Asthma APGAR score is developed by asthma specialists¹⁴, given in annexure II. In our setup, there is lack of diagnostic and monitoring facilities in our health care systems in peripheries. Furthermore, our patients are mostly illiterate and among literate patients, there is lack of awareness. So we need simple questionnaires like Asthma Control Test (ACT) which is easy to use, timely intervention, helps to quantify asthma control where spirometry not available, cost effective, easy to understand for illiterate patients, prevent emergency admissions, helps patients to manage their asthma. The rationale of study is Asthma Control Test (ACT) gives better stratification of asthmatic patients in our population.

MATERIAL & METHODS

THIS study was carried out at Mayo Hospital medical wards and emergency from 19/03 to 18/09/2015. It was descriptive cross sectional study.

After informed consent, Mayo Hospital, Lahore , all previously diagnosed asthma patients who full filled the inclusion criteria presenting at outdoor, indoor and emergency department of Mayo Hospital, Lahore were interviewed by the researcher. All patients had their asthma control test and were categorized A, B or C according to their asthma control test. A score ≥ 20 showed well controlled asthma or category A, 16-19 partially controlled asthma or category B and ≤ 15 poorly controlled asthma or category C. Data was entered and analyzed using computer program SPSS-10.

RESULTS

We included total of 129 patients, out of them 60(46.5%) patients were male and 69(53.5%) patients were female. The patients selected belong to 20 to 40 years of age. The patients' age was divided into two categories, 20 to 30 years and 31 to 40 years. Out of 129 patients, 72 patients (55.81%) belonged to 20 to 30 year age group and 57 patients (44.19%) belonged to 31 to 40 year age group.. There are 40 male patients between age 20-30 years, 20 between age 31-40 and there are 32 female patients between age 20-30 years and 37 between 31-40 years, p value is found to be (p=0.021).

Regarding BMI, we grouped patients into four on the basis of available data of patients, BMI 16-18.4 (underweight), 18.5-24.9 (normal), 25-29.9 (overweight) and 30 and above (obese). There were 14(10.9%) of patients were underweight, 83(64.3%) of patients had normal BMI, 29(22.5%) of patients were overweight and 3(2.3%) of patients were obese.

Among 129 patients, 9 male patients were underweight, 35 male patients had normal BMI, 14 male patients were overweight and 2 male patients were obese. Regarding female patients, 5 were underweight, 48 female patients had normal BMI, 15 of female patient were overweight and only 1 of female patient was obese and p value was found to be (p=0.402).

Regarding education, 29 patients (22.5%) were illiterate, 27 patients (20.9%) were primary educated, 22 patients (17.1%) were secondary educated, 30 patients (23.3%) were matric, 15 patients (11.6%) were graduates and 6 patients (4.7%) were university graduates.

Furthermore out of 60 male patients, 10 were illiterate, 11 were primary, 8 were secondary, 18 were matric, 8 were college and 5 were university graduates. Among 69 female patients, 19 were illiterate, 16 were primary, 14 were secondary, 12 matric, 7 were college and only 1 was university graduate. The p value was found to be (p=0.12).

Regarding asthma control, 33(25.58%) of 129 patients had asthma control of category A (completely controlled), 65 (50.38%) patients had asthma control of category B (partially controlled) and 31(24.03%) patients had asthma control of category C (poorly controlled).

Among 60 male patients 18 had asthma control category A (completely controlled), 33 had category B (partially controlled) and 9 had asthma control category C (poorly controlled). Among 69 female patients, 15 had category A (completely controlled), 32 had category B (partially controlled) asthma and 22 had category C (poorly controlled) asthma. The p value was found to be (p=0.077).

Regarding age and asthma control, it was found that, 18 patients between ages 21-30 years were having asthma control of category A, 40 patients had asthma control of category B and 14 patients had asthma control of category C. Among patients of age 31-40 years, 15 patients had asthma control of category A, 25 patients had asthma control of category B and 17 patients had asthma control of category C. The p value was found to be (p=0.315).

When asthma control was assessed according to BMI, it was found that, among 14 patients with BMI 16-18.4, 4 (underweight) had asthma control of category A, 5 had asthma control of category B and 5 had asthma control of category C. Among 83 patients

of BMI between 18.5-24.9 (normal BMI), 21 had asthma control of category A, 42 patients had asthma control of category B and 20 patients had asthma control of category C. Among 29 patients of BMI between 24.9-29.9 (overweight), 7 had asthma control of category A, 16 had asthma control of category B and 6 had asthma control of category C. Among 3 patients with BMI 30 or more (obese), 1 had asthma control of category A, 2 had asthma control of category B and none had asthma control of category C. the p value was found to be (p=0.847).

With respect to education, among 29 illiterate patients, 4 illiterate patients had category A (completely controlled) asthma, 14 had category B (partially controlled) asthma and 11 had category C (poorly controlled) asthma. Among 27 primary educated patients 9 had category A, 11 had category B and 7 had category C asthma. Among 22 secondary educated patients, 4 had category A, 13 had category B and 5 had category C asthma. Among 30 matriculates 9 had category A asthma, 15 had category B and 6 had category C asthma. Among 15 college graduates, 4 patients had category A asthma, 9 had category B asthma and 2 had category C asthma. Among 6 university graduates, 3 had category A and 3 had category B asthma and no

one had category C asthma. The p value was found to be (0.424).

Table 1: Asthma control, frequencies and percentages (n=129)

Asthma control	Frequency	%age
A (completely controlled)	33	25.58
B (partially controlled)	65	50.38
C (poorly controlled)	31	24.03
Total	129	100

Table 2: Gender wise distribution of asthma control (n=129)

Asthma control	Male	Female
A (n=33)	18	15
B (n=65)	33	32
C (n=31)	9	22
Subtotal	60	69
Total	1	29

P value 0.077

Table 3: Age wise distribution of asthma control (n=129)

Asthma control	Age	
	21-30 years (n=72)	31-40 years (n=57)
A (n=33)	18	15
B (n=65)	40	25
C (n=31)	14	17

P value 0.315

Table 4: BMI wise distribution of asthma control (n=129)

Asthma Control	BMI			
	16-18.4 (underweight) n=14	18.5-24.9 (normal) n=83	25-29.9 (overweight) n=29	30 above (obese) n=3
A (n=33)	4	21	7	1
B (n=65)	5	42	16	2
C (n=31)	5	20	6	0
Subtotal	14	83	29	3

P value 0.847

Table 5: Educational status wise distribution of asthma control (n=129)

Educational status	Asthma Control		
	A (n=33)	B (n=65)	C (n=31)
Illiterate (n=29)	4	14	11
Primary (n=27)	9	11	7
Secondary (n=22)	4	13	5
Matric (n=30)	9	15	6
College (n=15)	4	9	2
University (n=6)	3	3	0

P value 0.424

DISCUSSION

Asthma is a heterogeneous disease, affecting people worldwide. Asthma is treatable and some preventive measures can also decrease asthma probability. But it varies from patient to patient, family tendencies, their life style and their environment which determine who is getting asthma and who is not.

Once a patient gets asthma, it is important to control it and effective control depends on adherence to medications, regular check-ups, monitoring and preventing triggers and allergic environments.

To determine, patterns of asthma control in our region we conducted a study, we enrolled 129 patients, 60 (46.5%) patients were males and 69(53.5%) were females. We studied patients of age

20 to 40 years. Patients with comorbid conditions were not included in the study. This age group would show most accurate pattern of asthma control in our population and easier for us to determine the causes of poor control.

Gaylor Hoskins et al⁷ showed that females had 58% prevalence and males had 42% prevalence. In a study by Jumbo Johnbull et al⁴, 41.5% patients were male and 58.5% patients were female. Hina D Khan et al⁶ stated that, internationally, asthma is more common in females (65%) than males (35%) in USA and Australia. In their study, the same prevalence rates were seen among students of Army Medical College. But our study showed that prevalence was 53.5% in females and 46.5% in males. Though our results were in accordance with the studies by Gaylor Hoskins et al and Jumbo Johnbull et al but the factors in our setup were ignorance and female behavior in our rural setups to ignore their symptoms and seek medical attention only when there is emergency.

Fitz-Gerald JM et al states in GINA guidelines¹ that asthma is poorly perceived in elders as shortness of breath is taken normal in older age and also comorbid conditions complicate asthma. Gaylor Hoskins et al⁷ showed that 16% patients belong to 31-40 year age group as compare to 11% from 20-30 year age group. But in a study by Jumbo Johnbull et al⁴, asthma was more prevalent in patients of age group 31 to 40 years. Also in our study, patients' ages were grouped in two, 20 to 30 years and 31 to 40 years. And it was seen that 72 (55.81%) belonged to 20 to 30 year age group and 57 (44.19%) belonged to 31 to 40 year age group. This was in accordance to international study. Also in our study the difference was probably due to comorbid conditions like smoking, hypertension, diabetes or cardiac disease or other pulmonary conditions like tuberculosis, ILD etc, which excluded patients of 31 to 40 years from the study. This difference was more in male patients as males smoke, so development of COPD and more tendency of males to develop hypertension, diabetes and ischemic heart disease. Women smoke very less than males in our community and also estrogen in females plays a protective role in preventing ischemic heart disease, which is again a comorbid condition. So in females there was less difference in age groups and it was statistically significant, i.e $p < 0.05$ ($p = 0.021$).

Fitz-Gerald et al in GINA guidelines¹ suggested that asthma is more common in obese patients than non-obese patients. But obese patients have other respiratory illnesses also. In a study by Gaylor Hoskins et al⁷, 7% patients belonged to BMI < 18, 39% with BMI 18-25, 33% with BMI 25-30 and 21% with BMI > 30. In a study by Jumbo Johnbull et al⁴, 29.2%

patients had BMI < 18, 40% had BMI 18-25 and 31.8% of patients had BMI above 25.

In our study, 14(10.9%) were underweight, 83(64.9%) were having normal BMI, 29(22.5%) were overweight and 3(2.3%) of patients were obese. The difference was seen as we excluded all patients with morbid obesity and obese patients with other comorbidities from our study. Also patients with BMI < 18.4 with other comorbid conditions were excluded from the study. This pattern was nearly same in male patients but female patients with normal BMI were more than male patients. But this difference was statistically insignificant as the p-value was > 0.05 ($p = 0.402$). Despite this, many patients showed cushingoid features due to oral corticosteroid overuse by general practitioners. It reflected that these patients would have lower BMI if they were not cushingoid. We did not encounter any severe underweight patient. This also showed that low BMI had no effect on asthma prevalence. But obesity may aggravate asthma or other hypoventilation disorders.

A work by Matthew A Rank et al¹⁴ showed, 28.2% patients had education level of high school or less and 71.4% had educational level of post high school. In a study in Niger by Jumbo Johnbull et al⁴, more patients belonged to post secondary educational status. In a local study by Kaleem Ullah Toori et al¹⁴ in Islamabad showed, 18% of patients were illiterate, 8% primary, 12% middle, 24% matriculate, 14% intermediate, 14% graduate and 10% postgraduates. We found in our study that 22.5% patients were illiterate, 20.9% were primary educated, 17.1% were secondary educated, 23.3% were matric, 11.6% were college and 4.7% were university graduates. This showed literacy trends in our society. Low literacy rate and contentment on matriculation is a feature of our society. The difference in results when compare with Islamabad were due to, Islamabad is a big city and capital of the country and literacy rate far better than in rural and economically compromised areas of Lahore. When both sexes were compared, women were more illiterate than men. And women were mostly under matric. Male patients were predominantly matric. This was because, men stop at matric due to financial circumstances and try to acquire low scale job on the basis of matriculation. But this difference was statistically insignificant as the p-value is > 0.05 ($p = 0.12$).

Gaylor Hoskins et al⁷ showed that 36.8% patients had well controlled asthma, 26.9% patients had partially controlled asthma and 36.4% patients had poorly controlled asthma. In a study by Jumbo Johnbull et al⁴, using ACT, 37% of patients had well controlled asthma, 43% of patients had partially controlled asthma and 20% of patients had poorly

controlled asthma. Our study showed that, 33(25.58%) of patients had asthma control category A on ACT i.e., well controlled, 65(50.38%) patients had asthma control category B on ACT i.e., partially controlled and 31(24.01%) had asthma control category C on ACT i.e., poorly control asthma. There were factors which caused difference in international literature and our results. The reasons of more partially controlled asthma and poorly controlled asthmatic patients in our study were socioeconomic status, non adherence to medication, poor regimens by general practitioners, stopping treatment when symptoms get better and unable to change environment like rural background or occupational dusts in case of male patients.

But when male patients were compared with female patients, male patients had good asthma control than female patients. But statistically this different was not important as $p > 0.05$ ($p = 0.077$). This was due to, male patients are more educated than female patients and females are generally neglected in our society.

Comparing asthma control with the age groups, the results were not statistically significant i.e., $p > 0.05$ ($p = 0.315$). The reasons were same to both age groups, socioeconomic status, accessibility, non adherence to medication.

U. Emri et al showed that increasing BMI impairs asthma control. But in our study the relationship between asthma control and BMI was statistically insignificant as $p > 0.05$ ($p = 0.847$). This might be due to, patients with morbid obesity, obese patients with comorbid conditions and severe malnourished patients with comorbidities were excluded from study.

Paul M O'Byrne et al showed that poor educational status is related to poor asthma control. But in our study the difference was statistically insignificant i.e., $p > 0.05$ ($p = 0.424$). Only university graduates showed better asthma control. Ignorance is the main reason. When we interviewed the patients, with acquiring more education patients understand well but their socioeconomic status and inability to access tertiary care hospital with ease were the restraints in their asthma control that made their asthma control as worse as that of illiterate patients.

CONCLUSION

This study showed that a simpler tool, Asthma Control Test (ACT) can give an accurate picture of asthma control in our population. There is need to educate our health care providers about this tool, to classify asthma patients, suggest appropriate medications or change treatment plan and timely

refer the patients to higher health care facilities to prevent asthma related mortality and morbidity. This simple tool can be translated to Urdu or local languages and even illiterate patients can timely consult their physicians if they find any features of uncontrolled asthma.

REFERENCES

1. Fitz-Gerald JM, Reddel HK. Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention.[internet]2014. [cited: 2015]. Available from: <http://www.ginasthma.com>.
2. Ahmed A, Ahmed F, Raza MZ, Ghani, A Rizvi N. A Descriptive Analysis of Asthma Exacerbations and it's Mortality in Karachi, Pakistan. *J Aller Ther.* 2013;11(4). doi:10.4172/2155-6121.S11-004.
3. Morrison D, Wyke S, Agur K, Cameron EJ, Docking RI, MacKenzie AM et al. Digital Asthma self-management interventions: a systematic review. *J Med Internet Res.* Feb 2014,16(2):e51. Available from <http://www.jmir.org/payment/options/pay-per-view/2814/2>.
4. Johnbull J, Olaiya AB, Efosa EG. Assessment of Asthma Control Using Asthma Control Test (ACT) and it Relationship with Lung Function Parameters. *Greener Journal of Medical Sciences.* Oct 2013;3(8):276-28.
5. To T, Stanojevic S, Moores G, Gershon AS, Bateman ED, Cruz AA et al. Global Asthma Prevalence in Adults. *BMC Public Health.*2012;12(204).
6. Khan HD, Amir M, Khan MN, Khan U. Frequency of Asthma among students of Army Medical College. *Ann Pak Inst Med. Sci.*2011;7(3):142-45.
7. Hoskins G, Williams B, Jackson C, Norman PD, Donnan PT. Assessing Asthma control in UK primary care: Use of routinely collected prospective observational consultation data to determine appropriateness of a variety of control assessment models. *BMC Family Practice.* 2011;12:105.
8. Ekerljung L, Bossios A, Lotvall J, Olin AC, Ronmark E, Wennergren G et al. Multi-symptom asthma as an indication of disease severity in epidemiology. *EurRespir J.* 2011;38:825–832.
9. Wenzel S. Evaluation of severe asthma in adolescents and adults. UpToDate. [internet]2012. [cited;2015]. Available from: <file:///F:/Biocare%20Academic%20Service/UPTODATE%200.3/contents/mobipreview.htm?2/91/2780>.
10. Holton C, Crockett A, Nelson M, Ryan P, Baker RW, Stocks N et al. Does spirometry training in general practice improve quality and outcomes of asthma care? *Int J Qual Health Care.* July 2011;23(5):545553.
11. British Thoracic Society, Scottish Intercollegiate Guidelines Network: British guideline on the Management of Asthma.
12. Internet[2011].cited[2015]. Available from: <http://www.britthoracic.org.uk/document-library/clinical-information/asthma/btssignasthma-guideline-2014/>.
13. Morrison D, Wyke S, Thomson NC, McConnachie A, Agur K, SaundersonK, Chaudhuri, Mair FS. A Randomized trial of an Asthma Internet Self-management Intervention (RAISIN): study protocol for a randomized controlled trial. *Trials.*2014;15:185.
14. Honkoop PJ, Taylor DR, Smith AD, Stroband JBS, Sont JK. Early detection of asthma exacerbations by using action points in selfmanagement plans. *EurRespir J.* 2013;41:53–59.
15. Toori KU, Nabi S, Khattak S, Alam MT. Bridging the gap between guidelines and clinical practice: an audit of asthma management. *J Rawal Med Coll.* Jul - Dec 2012;16(2):94-6.